Installation & Service Manual for Vertical Media (VM) Series Collectors

MODELS
VM - 3000
VM - 6000
VM - 9000
VM - 12000

February 20, 2003

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DISCLAIMER:

Although instructions and recommendations are included for installation of your **Vertical Media (VM) Series Collector**, the manufacturer does not assume responsibility for the installation of this equipment nor shall he be held liable for direct or consequential damages resulting from improper installation, application, maintenance or use.

The immense variety of contaminants make it impossible to list all of the potential hazards that may be encountered with air pollution control systems. It is therefore important that the application of the equipment be discussed with an AER Control Systems representative or application engineer prior to use. Additionally, users should consult and comply with all National and Local Fire, Electrical and /or other appropriate codes when determining the application, location and operation of any air pollution control equipment.

Collection of combustible or explosive materials and collection on flame or spark-generating operations may require specific system configurations (contact AER Control Systems LLC. Applications Engineering Department for questions and/or design assistance). The combined collection of combustible or explosive materials and contaminants from spark or flame generating operations, with a common collector or duct system, is not recommended, unless special design provisions have been made to the system (sparks or flames resulting from such operations may ignite the combustible or explosive material). Under no circumstances should anyone be allowed to discard a lighted cigarette, other burning materials, or refuse into an inlet hood or the duct of the collection system. It is the responsibility of the end user to comply with all applicable national, state, and local fire and safety codes.

This manual should be read completely before attempting Operation or Maintenance of this equipment. All work should be performed by qualified personnel according to local requirements.

WARNING

Failure to comply fully with the following instructions and local code requirements may increase your risk of physical injury due to fire, explosion or electrical shock.

All data and dimensions in this manual have been thoroughly checked however, we cannot assume responsibility for possible errors or omissions. We reserve the right to change designs and/or specifications without notice.

SECTION 1

UNCRATING

1. Remove banding and cardboard shipping carton and packing.

2. The 3000 unit is typically shipped lying down and the 6000 units and higher are shipped in the vertical position. Units with a floor stand and inlet plenum are shipped on a separate skid. Attenuators and outlet plenums if supplied are typically shipped on the skid with the floor stand and inlet plenum. Mounting hardware, gasket material and drain kit (optional drain bottle) is included in labeled boxes, be sure to check all boxes before discarding.

3. Inspect the exterior of the unit and accessories for shipping damage or shortages that may not have been noticed or recorded when the shipment was initially received; you have 30 days to notify AER Control Systems LLC. of any discrepancies. Contact the shipping company if any damage or shortages have occurred.

Description & Operation

The standard VMD and VMW series collectors consist of an inlet plenum, a standard 3 stage filtration module, and a blower module. The VMD Module houses disposable filter stages that include a 1 inch fiberglass filter, a 4 inch pleated multi-vee filter, and a 36 inch long 10 pocket 95% ASHRAE efficient disposable fiberglass Vee-bag filter and is intended for dry or moist contaminants. The VMW Module houses filter stages that include a 4 inch cleanable Chevron Impinger, a 1 inch cleanable metal mesh filter and a 36 inch long, 10 pocket 95% ASHRAE disposable fiberglass Vee-bag filter and is intended for wet contaminants. A standard unit would also consist of an inlet plenum for mounting collars for ductwork attachment. The inlet plenum for wet applications has a drain fitting for removal of the coolant and a 10 foot drain hose to transport the coolant to either the sump of the machine or a container. The standard blower module consists of a belt driven forward curved squirrel caged blower and an electric drive motor with an adjustable sheave which is typically mounted on the clean air side of the filters.

The VMDH and VMWH series collectors are the same units as described above with the addition of a HEPA Module. The HEPA Module houses a standard HEPA filter rated 99.97% efficient at 0.3 micron (other efficiencies available). This module is typically mounted after the 3 stage filter module and before the blower module.

Optional Filter Modules

1. VMM Module – This module is a 2 stage filter module for dry or moist contaminants and houses a first stage fiberglass disposable prefilter and second stage disposable 4 inch pleated multi-vee filter.

2. VMl Module - This module is a 2 stage filter module for wet contaminants and houses a first stage cleanable 4 inch Chevron impinger followed by a second stage cleanable 1 inch aluminum mesh filter.

3. VMM3 & VMI3 Modules - An optional, field retrofittable Zee track can be added to the VMM and VMI modules (reference VMM and VMI module descriptions) that can house a third stage 4 inch filter (impinger, mesh, multi-vee, etc.). The 3 in the model code indicates that this third stage option was included on the unit from the factory.

4. VMC1 Carbon Filterfold Module - This module is a two stage filter module. The first stage is a 45-lb. bed of activated carbon between two perforated metal walls which are formed into a continuous series of pleats. The second stage is a disposable 1 inch pleated multi-vee filter.

5. VMB Module – Motor/blower modules are available with several motor horsepower options. This module is equipped with the motor wired to an external powered connection box with a power indicator light.

   An optional blower configuration is a direct drive blower mounted to the motor shaft (sometimes called a Plug Fan); the nomenclature for a direct drive fan is at the end of the model number designated by a dash number identifying the fan and motor horsepower combination. An example would be VMW-30-02; the dash 02 is a specific fan and motor combination.

6. Inlet Plenums - Plenums are generally supplied as part of a ducted VMD & VMW and provide easy hose or duct connection for collector pickups. Optional side extension plenums can also be supplied. An extension plenum is an alternative to a 90 degree elbow; it is essentially a plenum box where the air makes a 90 degree turn inside the box.

7. Floor Stands – Standard floor stands are 36 inches tall designed to support the VM series collector with provisions for bolting the stand to the floor.

Optional Equipment

Motor Starters Special Filters Custom Designs
Outlet Plenums Direct drive fans
Attenuators Mounting brackets & stands

SECTION 2

APPLICATIONS – GENERAL

1. Mist, dust, fume, smoke, & vapor – The VM series collectors are designed for the capture and removal of mist, dust, fume, smoke, and gas/vapor contaminants from a wide variety of manufacturing processes. The standard VM series collector is a modular system consisting of an inlet plenum, 3 stage filtration module for wet or dry/moist contaminants and a blower and motor module. A HEPA module can be added after the standard 3 stage filter module to handle smoke. Additional modules can be added depending on the type of particulate being collected (See optional filter module section). For example if a heavy load of mist is collected then an additional impinger can be added. If a gas vapor exists then the carbon module can be added. These are just a couple of examples, there are many more filter stages or configurations that can be created with the VM series collectors.

   The VM series collectors can either be floor mounted with an optional floor stand, ceiling hung or wall mounted.

2. Size – It is important that the proper size unit has been selected for the application. Too little airflow will not draw the contaminant into the filter and the unit will not be completely effective. Too much airflow may result in loss of efficiency or the unit will pick up large or heavy solid particles increasing the frequency of maintenance or filter replacement. Questions regarding proper unit sizing should be directed to your local AER Control Systems representative or the main office (toll free 866-265-2372).

3. Models - Model codes are utilized to identify the various unit configurations available. The model VM (Vertical Media) collector is available with wet filter stages (VMW) or dry filter stages (VMD). The VM series collector is available in a 3000, 6000, 9000, or 12,000. The 3000 is a one module collector, a 6000 is a two, a 9000 is a three, and a 12,000 is a four module collector. Larger sizes are available up to 24,000, which is an 8 module collector. Other filter modules can be added to the base unit which typically includes an inlet plenum, 3 stage filter module with filters for wet or dry/moist contaminants, and a blower module. Reference the section under optional filter modules for an example of other filter modules available. Common examples of model codes are as follows; VMWH (standard unit with a HEPA), VMIW (standard unit with an extra impinger module), and a VMIWH (standard unit with both an impinger and HEPA module).

SECTION 2

APPLICATIONS (continued)

The standard units are equipped with belt driven blowers. A unit with a belt drive blower has a designation of either a 3000, 6000, 9000, or 12,000. Optional direct drive blower packages are available and the designation for a direct drive is a dash followed by a number which specifies the direct drive blower size and horsepower of the motor. For example a VMW-30-02 is a 3000 series with a 10 inch diameter wheel and a 1 horsepower motor.

Occasionally a unit is supplied without a blower/motor, the model designation for this would be to drop the last to zeros, and for example a VMW-12,000 without a blower would have a model number of VMW-120.

A custom or special unit will have an S code after the model number of the unit. The S code is a flag and indicates that this unit is special; it does not specify as to how the unit is special. Special is something other then standard, for example explosion proof motor, unique filters, or different filter configuration.

4. Inlet Plenums & Collars – Inlet plenums are standard with a base unit, the VMW units are supplied with a 10 foot drain hose and fitting. The bottom of the plenum is tree panned for better drainage. The VMD units do not have a drain fitting and hose. One inlet collar is standard with the base unit, additional collars are available. The size of the collar is dependent upon the airflow through the ductwork. The inlet collar provides a method for attaching ductwork or flex hose to the inlet plenum.

SECTION 3

INSTALLATION

Assembly & Installation VM Series Collectors

1. Standard collectors are shipped without the inlet plenum and optional floor stand (if supplied) installed (mounting hardware and gasketing is included). The standard 3000 series is shipped laying horizontally on the skid, the 6000 series and higher is shipped in the vertical position. Collectors can be suspended from the ceiling or floor mounted (Optional ceiling mount kits & floor stands are available). Weld nuts for permanent mounting (bolt to frame or hang with threaded rod, cable or chain) are welded in the corners of each module on the top of the cabinet. Pad eyes for lifting, assembly, and mounting are provided.

2. The floor stand if supplied, should be located close to the pick up source as possible. The stand should be level and bolted to the floor before the collector is mounted to the inlet plenum and floor stand. The inlet plenum drops into the floor stand and the holes on the plenum should align with the tabs on the floor stand. The gasketing should be installed on the horizontal lip of the inlet plenum. (The gasketing is shipped loose).

3. The inlet plenum for the VMW collector is shipped with a drain fitting and 10 feet of 1 ¼ inch drain hose. The drain fitting is typically installed in the bottom of the inlet plenum, the drain hose barb is shipped loose and should be installed in the fitting. The drain hose slips over the barb fitting and the other end should be submerged in the sump of the machine or a suitable container. If you can't submerge the end of the drain hose then a loop should be created with the hose to provide a trap similar to the trap under a household sink. An alternative is to attach air tight drain bottles to the bottom of the inlet plenum (two drain bottle sizes are available as an option from AER Control Systems LLC). This is necessary so air is not drawn up through the drain line which would prevent fluid drainage. The inlet collar should be attached to the outside of the plenum using a sealant such as silicone or any other sealant that is suitable with the coolant used. The collar can be added before or after the unit is mounted to the inlet plenum. On units with floor stands the plenum should be installed in the stand before mounting the collar.

4. Once the floor stand and inlet plenum are in place, the VM collector can be lowered into the inlet plenum. While lowering the collector into the floor stand and inlet plenum make sure the holes with the threaded inserts on the two bottom sides of the collector are aligned with the holes in the inlet plenum and tabs on the floor stand. Secure the inlet plenum and floor stand with attaching hardware (bolts, washers, and lock washers provided) into the threaded inserts on the collector. If the floor stand is not used, the inlet plenum can be bolted directly to the bottom of the collector, check to make sure the gasketing is in place before attaching the collector to the inlet plenum.

SECTION 3

INSTALLATION (continued)

5. The blower module is typically installed on the 3000 and standard 6000 and 9000 series collectors. The blower module is not usually installed on 6000 series collectors with multiple modules (such as HEPA or impinger modules) and larger series collectors. A blower transition is attached to the blower module on the 6000 series collector up to the 24,000 series. The blower module and transition is typically shipped inside the inlet plenum and floor stand. Apply gasketing (supplied) to the top of the collector between the bolt holes and outside edge of the cabinet before mounting the blower module. Lift the blower module using pad eyes on the top of the module and lower it on top of the collector. Make certain the holes are in alignment, open the doors on the collector and pull the filters out for easier access. Bolt the modules together using attaching hardware (bolts, washers, & locknuts supplied).

6. For suspended installations the pad eyes can be used, the 3000 series has one set located on the blower module, the 6000 series and higher have a set of pad eyes located on both the top of the blower module and a set attached to the sides of the filter module below the blower transition. Both sets of pad eyes should be use on collectors with blower transitions.

7. If optional equipment is supplied with the collector such as sound attenuators, this can be attached to the top of the blower module after installation using the supplied fasteners.

Electrical

1. All three-phase units are wired for the input voltage specified on the purchase order. Unless specified otherwise, standard units are wired for 460 volt, 3 phase, and 60 HZ operation.

2. Motors used on the VM series collectors are UL recognized and internal wiring is UL rated at 600 volts. Input power line protection is required for the motor and electrical components. Line load and current requirements are identified on the motor nameplate. Unless ordered with the machine, the power switch for operating the machine, any fusible disconnect, motor starter or controller are to be provided by the customer/user and located externally to the machine.

3. All connections to the unit are made at the surface mounted terminal box on the side of the machine. Remove the cover by removing the two retainer screws. The cover has a gasket seal and may require a stiff pull to remove it.

SECTION 3

INSTALLATION (continued)

NOTE

A motor starter with thermal overload protection must be provided by the User. Thermal overload heaters are installed in the external motor starter. Consult the starter manufacturer for recommended heater size for the installed motor.

4. A standard 7/8-inch knockout is provided in the side of the box for a cable connector. Motor connections are made at the terminal strip in the box.

WARNING

Permanent damage to the motor will be sustained if connected to voltages other than the normal operating voltage for which the unit is pre-wired.

5. The motor is pre-wired for the voltage as labeled in or near the outside of the electrical box. Observe these ratings. Verify the incoming voltage prior to connecting it to the machine. Motor and electrical box wiring are shown below:

SECTION 3

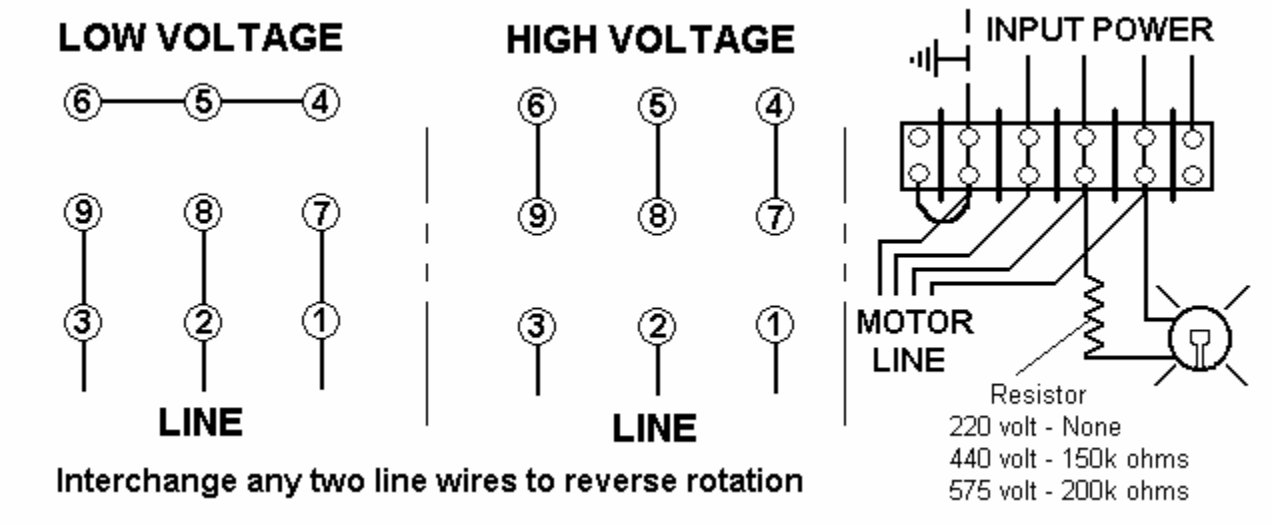


Figure 1: Motor & Electrical Box Connection Diagram

SECTION 3

INSTALLATION (continued)

6. Verify proper rotation of the blower motor. It will be necessary to open the blower module access door to view the rotation. Proper rotation is marked on the motor housing. The blower pulley should be rotating counterclockwise when viewed from the driven (pulley) end. If opposite rotation is experienced, interchange any two line wires from the power line to the terminal strip in the connection box. Do not operate the blower for more than two minutes with the blower door (or any of the module doors open) as over amping will occur and may trip the heater overloads or damage the motor.

7. Close the blower cabinet door and secure it with the door latches. Check that all filters are in place and all doors are securely shut before starting the machine. A small amount of fine dust or particulate may be discharged. This is normal, as some dust accumulation may have occurred in the blower area during shipping. Activated carbon modules may initially release some small amount of carbon dust due to product settling (most dust will be captured by the pleated multi-vee post filter after the carbon cell)

Magnehelic Gauge

1. The Magnehelic gauge is typically mounted on the 3 stage media module and measures the pressure drop across all the filters in the unit. If a HEPA module is supplied, an optional second Magnehelic gauge may be mounted to measure the pressure drop across just the HEPA filter.

2. The Magnehelic gauge has two needles one is a red needle that indicates the pressure drop reading and the other is a movable black needle that can be set to flag the reading on the gauge (a set point that indicates when the filters should be changed). Although not required, to zero in the gauge, run the collector with new clean filters and turn the screw at the bottom face of the gauge to zero. This is your starting point with clean filters in place.

3. Periodically check the design airflow whether it be weekly or monthly. Eventually the pressure drop reading will reach a point where there is insufficient airflow to capture the contaminants generated. Move the black pointer to the reading on the Magnehelic gauge. In the future a quick look at the gauge will give you a sense of when the filters will need to be changed In some cases the first or second stage filter could be dirty and the third stage filter (bag filter) is fine. To check this scenario, pull out the first or second stage filter to see if the design airflow improves and gauge reading goes down. If it does, then either clean or replace the first or second stage and leave the third filter (bag filter) alone. The third stage filter (bag filter) will need to be changed when removal of the first and second stage filters have little or no change on airflow or on the magnehelic guage reading.

SECTION 4

Ordering Replacement Parts

Information required for prompt identification of replacement parts will be:

1. Model and Serial Number
2. Part Number and/or Description

Contact your local AER Control Systems LLC. distributor for replacement parts. Use either our toll free telephone number or our website www.aercontrolsystems.com to obtain the nearest AER Control Systems LLC. distributor's name and telephone number.

1-866-265-2372

DESCRIPTION	PART No.
SINGLE BLOWER ASSEMBLY FOR VMB-30	1006-01
DOUBLE BLOWER ASSEMBLY FOR VMB-60/90/120	1006-02
MAGNEHELIC GUAGE KIT 0-10"	H10026-01
DRAIN FITTING	1086-01
DRAIN HOSE KIT FOR VMW 30/60	H10024-01
BOTTLE DRAIN 32oz.	H10023-01
BOTTLE DRAIN 128oz.	H10025-01
DOOR GASKETING	1102-01
MISCELLANEOUS HOSES & CLAMPS	
4" x 10' NEOPRENE/POLYESTER FLEXHOSE	1051-01
6" x 10' NEOPRENE/POLYESTER FLEXHOSE	1051-02
8" x 10' NEOPRENE/POLYESTER FLEXHOSE	1051-06
10" x 10' NEOPRENE/POLYESTER FLEXHOSE	1051-07
12" x 10' NEOPRENE/POLYESTER FLEXHOSE	1051-08
8" x 11' HEAVY DUTY ORANGE STRIPE PVC/POLYESTER FLEXHOSE	1051-14
HOSE CLAMP 4" BRIDGE	1050-10
HOSE CLAMP 6" BRIDGE	1050-11
HOSE CLAMP 8" BRIDGE	1050-12
HOSE CLAMP 10" STANDARD FOR ANY HOSE	1050-07
HOSE CLAMP 12" STANDARD FOR ANY HOSE	1050-08
MISCELLANEOUS SPARE PARTS	
IMPINGER CELL, VMW & VMI-30	H10015-01
IMPINGER CELLS **(2 REQUIRED) VMW &** VMI-60	H10015-01
IMPINGER CELLS **(3 REQUIRED) VMW &** VMI-90	H10015-01
IMPINGER CELLS **(4 REQUIRED) VMW &** VMI-120	H10015-01
MISCELLANEOUS FILTERS	
FIBERGLASS PREFILTER 1" x 24" x 24"	1034-01
6 - PACK PREFILTER 1" x 24" x 24"	1034-02
MULTI - VEE FILTER 4" x 24" x 24"- 40%	1035-05
6 - PACK MULTI - VEE PREFILTER 4" x 24" x 24"- 40%	1035-06
VEE BAG FILTERS, 21" SPECIAL LOOPS, 95%	1039-07
6 - PACK VEE BAG FILTERS, 21" SPECIAL LOOPS, 95%	1039-10
VEE BAG FILTERS, 36" SPECIAL LOOPS, 95%	1039-01
6 - PACK VEE BAG FILTERS, 36" SPECIAL LOOPS, 95%	1039-04
ALUMINUM PREFILTERS, 1" x 24" x 24"	1034-03
6 - PACK ALUMINUM PREFILTERS, 1" x 24" x 24"	1034-04
PLEATED POST FILTER 1" x 24" x 24"	1035-09
6 - PACK PLEATED POSTFILTERS, 1" x 24" x 24"	1035-10
CARBON FILTER FOLD - 45 lbs.	1044-01
HEPA FILTER, 24" x 24" x 12", 95%	1040-06
HEPA FILTER METAL FRAME, 24" x 24" x 12", 95%	1040-07
HEPA FILTER, 24" x 24" x 12", 99.97% @ .3 microns	1040-02
HEPA FILTER METAL FRAME, 24" x 24" x 12", 99.97% @ .3 microns microns	1040-05
ACTIVATED CARBON 50 lb. BARREL	1046-02
MISCELLANEOUS MOTORS & ELECTRICAL	
2 HP, 230/460 V, 3 PHASE MOTOR FOR VM MEDIA UNITS	1001-14
3 HP, 230/460 V, 3 PHASE MOTOR FOR VM MEDIA UNITS	1001-19
5 HP , 230/460 V, 3 PHASE MOTOR FOR VM MEDIA UNITS	1001-24
7.5 HP, 230/460 V, 3 PHASE MOTOR FOR VM MEDIA UNITS	1001-27
RED INDICATOR LAMP	1205-02
2 HP BLOWER SHEAVE	1009-01
2 & 3 HP MOTOR SHEAVE	1009-03
3 HP & 5 HP BLOWER SHEAVE	1009-02
5 HP MOTOR SHEAVE	1009-10
7.5 HP BLOWER SHEAVE	1009-20
7.5 HP MOTOR SHEAVE	1009-13

SECTION 5

MAINTENANCE

Operation & Maintenance

Lubrication or other routine periodic preventive maintenance is not required. All that is needed is an occasional check of fasteners and a general visual check of the unit to make sure that nothing has gone wrong. Periodic replacement of the filters is required when necessary. Check V-belt tension periodically, see the following section on the procedure to tighten the belt. See the section under Magnehelic gauge for when to change filters. Dispose of filters in accordance with local standards and procedures for the material collected.

Filter Replacement for the VM Series Collectors

Warning
Disconnect & lock out electrical power to the collector before filter change

Access to all the filters is accomplished by opening the outside hinged door on the three stage media module and turning the T handles a quarter turn.

1. Impinger Replacement on VMW collectors
   The 4 inch impinger is the first stage of the three stage media module. Once the outside filter access door is opened, the impinger can be removed by dropping down the internal hinged gate door (flip down door) and sliding the impinger out. The aluminum impinger is cleanable and can be washed with mild detergent or solvent.

2. Aluminum mesh filter replacement on VMW collectors
   The 1 inch aluminum mesh filter is the second stage of the three stage media module. This filter can be accessed by dropping down the gate door and sliding the mesh filter out of the cabinet. The cleanable aluminum mesh filter can be washed with mild detergent or solvent, but it is important to be gentle while washing. Observe the "direction of flow" indication on the filter. Insert the filter with this arrow facing the Vee-bag/blower module direction.

3. Vee-Bag Replacement on both the VMW and VMD collectors
   a. Locate and remove the bag support rod by reaching through the top of the door and raising the rod from its retainer brackets. The back of the rod is hinged and can be lowered. Slide the rod with the bag loops from the support rod out of the unit while sliding the filter header from the bottom of the unit. Once the bag is out of the unit then un-hook the bag support loops from each end of the bag slide rod and remove the rod.

SECTION 5

MAINTENANCE (continued)

b. Once the bag has been removed from the slide rod then place in a plastic bag or dispose according to local requirements.
c. Install a new Vee-bag filter with paper retainer strip in place and with the sides of the bag pockets across the door opening. Take caution when sliding the bags into the tracks so that the bags do not catch and tear on the metal edge of the filter retainer hold downs.
d. When filter is fully seated, remove the paper strip.
e. Reaching through the access door, fan out the bags and insert the bag slide rod through all of the loops. Remember to clip the ends of the bag loops at each end of the slide rod. When completed, slide the bag slide rod onto the hinged support rod and clip the end of the support rod into the retainer bracket at each end. See Figure 2 illustrating how the bag loops are installed on the support rod.
f. Close and secure door. Close the blower module door if it was opened. **Do not operate machine with any of the access doors opened for more than two minutes.**
g. Restart machine. Check for normal operation.

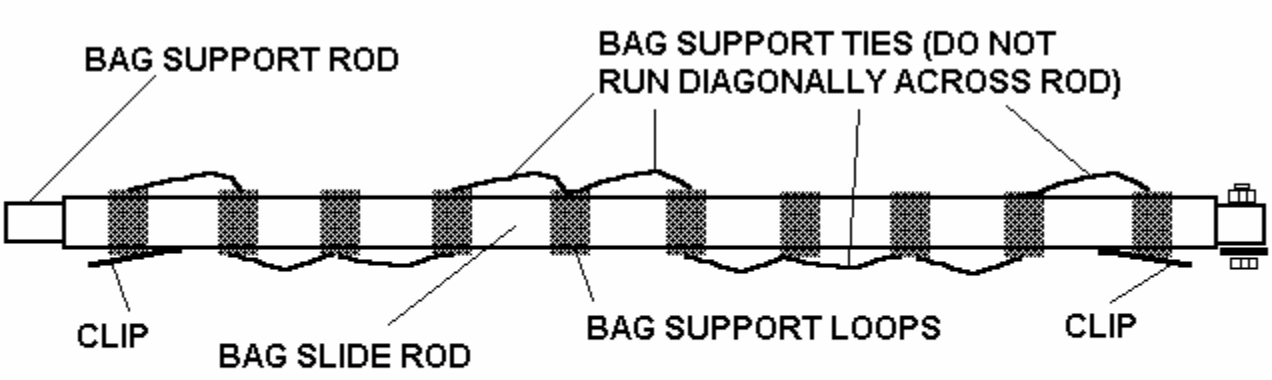


Figure 2: Vee Bag Support

SECTION 5

MAINTENANCE (continued)

4. HEPA Filter Inspection and Replacement on VMH Module
   a. Open the access doors, and rotate the yellow handles up on both sides of the Cam Clamps.
   b. Carefully remove the filter by prying it away from the sealing surface (toward the Cam Clamps).
   c. Inspect the filter for damage. If ripped, or visibly damaged, discard & replace.
   d. Unpack new HEPA and inspect sealing surface. Carefully slide it into the cabinet with gasket toward the metal seal edge.
   e. Rotate the yellow Cam Clamps down and to lift and seal HEPA in cabinet; make sure the gasket is in full contact with metal seal edge of the cabinet.

5. Carbon Filter fold Module on VMC-l Module
   a. Open the access door for the carbon module. Rotate yellow handles on both sides of cam clamp & pull carbon cell out (approximately 85 lbs) and frame with post filter out of cabinet
   b. Remove the two piece post filter frame & check the 1 inch pleated multi-vee post filter. Separate frame and replace filter if required.
   c. Remove screws from top of metal carbon cell, then empty carbon into suitable container.
   d. Replenish the carbon cell with fresh carbon and rap cell to settle carbon. Refill as required and replace top.
   e. Install post filter frame and filter on carbon cell and slide the assembly back into the carbon module.
   f. Rotate the yellow Cam Clamps down to lift and seal the carbon cell and post filter assembly in the cabinet; make sure the gasket is in full contact with the metal seal edge of the cabinet.

NOTE: A simple method for maintaining carbon modules is to have an extra carbon cell on hand for replacement with a minimum of down time. The contaminated cell can be refilled or shipped to a refurbishing center.

6. Fiberglass disposable filter on VMD collectors
   The fiberglass filter is the first stage filter on the three stage media module (VMD collector). This filter can be accessed by dropping down the gate door and sliding the disposable fiberglass filter out of the cabinet. Observe the "direction of flow" indication on the new replacement filter. Insert the filter with this arrow facing up toward the Vee-bag/blower module.

SECTION 5

MAINTENANCE (continued)

7. Multi-Vee Filter Replacement on VMD collectors
   The multi-vee filter is the second stage filter on the three stage media module (VMD collector). Once the access door on the three stage filter media module is opened and the flip down gate door is hinged down then the disposable multi-vee filter can be slid out of the cabinet. Observe the "direction of flow" indication on the new replacement filter and insert the filter with this arrow facing up toward the Vee bag/blower module.

8. Optional two or three stage prefilter module on the VMW or VMD collectors
   The prefilter module can be mounted before the three stage media module and it houses cleanable 4 inch aluminum impinger and 1 inch aluminum mesh filters (VMI) or a disposable 1 inch and 4 inch multi-vee filters (VMM) as a standard set up. The access to these two filters is accomplished the same as previously mentioned by dropping down the internal gate door and sliding the filters out of the cabinet. In the same prefilter module a third stage filter can be added with the addition of a Zee track to accommodate a 4 inch, third stage filter (VMI3 or VMM3). The access to this filter is the same as above.

9. Cleaning and Inspection of Cabinet
   After dirty components have been removed, inspect cabinet interior. Remove foreign material, wipe interior, and clean all filter-seating or sealing surfaces.

V-Belt tensioning on blower/motor

NOTE: Disconnect and lockout power before servicing

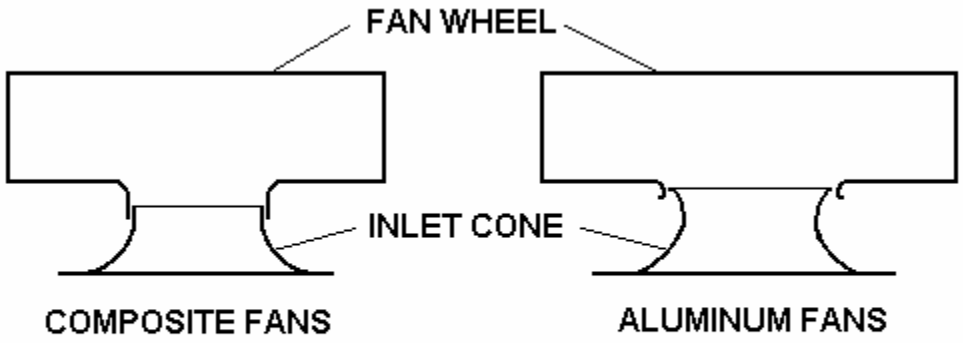
1. Open the hinged blower/motor door by turning the slotted latches a quarter turn. This will gain access to the blower/motor and belt drive. Tensioning the belt is accomplished by loosening the four bolts on the motor mount plate and sliding the motor and mount plate toward the filters away from the blower. Make sure the belt alignment is straight before re-tightening the bolts on the motor mount plate.

Direct drive blower wheel and inlet cone check

NOTE: Disconnect and lockout power before servicing

1. Open the blower/motor panel by loosening the four hex head bolts that hold the blower panel onto the blower module or cabinet. Remove the panel to gain access to the inlet cone to the blower, the direct drive blower wheel, and motor. It is very important to maintain the correct inlet cone insertion into the blower wheel inlet. There can not be any large air gaps between the top of the cone and the bottom of the blower wheel. If a

gap occurs then the blower wheel's efficiency is diminished and airflow is reduced. There is a curved radius at the blower inlet where the air enters the wheel and inlet cone is inserted into the wheel. The blower wheel should be located so that the top of the inlet cone is at the midpoint of the blower wheel's curved inlet radius.



DIRECT DRIVE (PLUG FAN) FAN ALIGNMENT

Figure 3: Direct Drive Fan Alignment

Troubleshooting

Problem	Cause	Solution
Motor fails to start	No power to unit (indicator light is not lit)	Check overload heaters in starter and fuses and replace or reset if necessary. Check for proper wire connections to and from the starter and collector.
	Power to unit (indicator light is lit)	Check wires from input electrical box on collector to motor. Check motor wiring. Check to see if motor is faulty.
Low airflow and/or suction	Blower is running backwards	Check rotation of blower. If running backwards, interchange 2 of the 3 input power leads (3 phase motors only)
	Filters are dirty or blocked	Replace or clean filters or check filters for blockage
	Obstruction in ducting	Check ducting for blockage. Check for dampers in the duct system, they may be closed.
	Duct resistance too high	Improper duct design or higher pressure fan is required.
Contaminant blowing out of collector exhaust	Damaged or hole in the filters	Replace filter
	Filters are not properly installed	Check seal edge on HEPA Check seals around filter
Motor/blower noise or vibration	Loose belt	Tighten or replace belt
	Motor cooling fan is rubbing on cover	Adjust motor cooling fan cover so that it does not rub or hit.
	Loose fan blades	Replace fan wheel or blower
Indicator light is off but motor and blower is running	Light is not getting power	Check for input voltage at light or replace indicator light

Specifications

The following specification chart will give the important information for each module. Overall sizes, weight, filter area can be figured out by totaling module data. The dimensions are taken as if you are facing the access doors on the unit, the doors would be the front of the unit and the depth dimension is from the front to the back. The width dimension is from one side to the other side.

The single asterisk includes the door handle. The double asterisk includes the Magnehelic gauge. The triple asterisk includes the electrical box. The four asterisk notation indicates the blower transition height is included.

Filter Module Specifications								
VM Series Module	Prefilter	Intermediate	Final/Main	After filter	Weight lbs	Dimensions		
						Depth	Height	Width
VMI-30			Impinger 24X24X4		55	26.75*	14	30
VMI-60			(2) Impinger 24X24X4		110	26.75*	14	60
VMI-90			(3) Impinger 24X24X4		165	26.75*	14	90
VMI-120			(4) Impinger 24X24X4		220	53.5*	14	60
VMM-30			4" MultiVee 28ft^2		50	26.75*	14	30
VMM-60			(2) 4" MultiVee 56ft^2		100	26.75*	14	60
VMM-90			(3) 4" MultiVee 84ft^2		150	26.75*	14	90
VMM-120			(4) 4" MultiVee 84ft^2		200	53.5*	14	60
VMD-30	1" Fiberglass 4ft^2	4" MultiVee 28ft^2	Vee bag 126ft^2		120	26.75*	46	32.5**
VMD-60	(2) 1" Fiberglass 8ft^2	(2) 4" MultiVee 56ft^2	Vee bag 252ft^2		195	26.75*	46	62.5**
VMD-90	(3) 1" Fiberglass 12ft^2	(3) 4" MultiVee 84ft^2	Vee bag 378ft^2		269	26.75*	46	92.5**
VMD-120	(4) 1" Fiberglass 16ft^2	(4) 4" MultiVee 112ft^2	Vee bag 504ft^2			53.5*	46	62.5**
VMW-30	Impinger 24X24X4	1" Aluminum 4ft^2	Vee bag 126ft^2		125	26.75*	46	32.5**
VMW-60	(2) Impinger 24X24X4	(2) 1" Aluminum 8ft^2	Vee bag 252ft^2		205	26.75*	46	62.5**
VMW-90	(3) Impinger 24X24X4	(3) 1" Aluminum 12ft^2	Vee bag 378ft^2		284	26.75*	46	92.5**
VMW-120	(4) Impinger 24X24X4	(4) 1" Aluminum 16ft^2	Vee bag 504ft^2			53.5*	46	62.5**
VMH-30			12" HEPA 24X24X12		118	26.75*	17	30
VMH-60			(2) 12" HEPA 24X24X12		210	26.75*	17	60
VMH-90			(3) 12" HEPA 24X24X12		318	26.75*	17	90
VMH-120			(4) 12" HEPA 24X24X12			53.5*	17	60
VMC1-30			Carbon 45Lbs	1" multivee 9ft^2	165	26.75*	17	30
VMC1-60			(2) Carbon 90Lbs	(2) 1" multivee 18ft^2	304	26.75*	17	60
VMC1-90			(3) Carbon 135Lbs	(3) 1" multivee 27ft^2	462	26.75*	17	90
VMC1-120			(3) Carbon 180Lbs	(3) 1" multivee 36ft^2		53.5*	17	60
INLET PLENUM 30					20	21.38	14	27
INLET PLENUM 60					35	21.38	18	57
INLET PLENUM 90					50	21.38	24	87
INLET PLENUM 120						46	24	57
FLOOR STAND 30					79	25	36	30.5
FLOOR STAND 60					93	25	36	60.5
FLOOR STAND 90					108	25	36	90.5
FLOOR STAND 120						49.5	36	60.5
VMB-30					195	25.5	31	34***
VMB-60					380	25.5	37****	50***
VMB-90					420	25.5	37****	50***
VMB-120					380	25.5	37****	50***

Motor Specifications				
Motor – HP	2	3	5	7.5
Motor Temp. Max - C	40	40	40	40
Speed RPM	1725	1725	1725	1725
Voltage	230/460	230/460	230/460	230/460
Frequency Hz	60	60	60	60
Phase	3	3	3	3
Frame - NEMA	56/56H	56/56H	184T	213T
Power Factor	77	89	79	76
Efficiency	82.5	82.5	87.5	89.5
Start Current Amps (60 Hz.)	44/22	65.8/32.9	96/48	145.2/72.6
Full Load Amps (60 Hz)	6.2/3.1	7.6/3.8	13.4/6.7	20.4/10.2
Insulation Class – Min.	B	F	F	F
Enclosure	TEFC	TEFC	TEFC	TEFC
Service Factor	1.15	1.15	1.15	1.15
Duty Cycle	Cont.	Cont.	Cont.	Cont.
Bearing Grease	Exxon POLYREX®EM	Exxon POLYREX®EM	Exxon POLYREX®EM	Exxon POLYREX®EM
Specification	UL & CSA Approved	UL & CSA Approved	UL & CSA Approved	UL & CSA Approved

LIMITED WARRANTY

AER Control Systems LLC warrants all products sold only to purchasers for use in business or for resale, against defects in workmanship or materials under normal use, for one (1) year after the date of purchase from AER Control Systems LLC. Misapplication of the product, decomposition by reaction or chemical action and wear caused by abrasion will not constitute, or be considered as a defect. Warranty is void if the product has been subject to damage, unreasonable use, neglect, improper service, improper installation or other causes not arising from defects in original material or workmanship. Any part that is determined to be defective in material or workmanship and returned to an AER Control Systems LLC distributor or authorized service facility, as AER Control Systems LLC designates, shipping cost prepaid, will be, as the exclusive remedy, repaired or replaced at AER Control Systems LLC's option. AER Control Systems LLC shall not be liable for any incidental or consequential cost, expenses, or damages resulting from any failure, defect or malfunction of this product, liability is expressly disclaimed. AER Control Systems LLC's liability in all events is limited to and will not exceed, the purchase price of the product. Title and risk of loss pass to the buyer on delivery to the common carrier. If a product is damaged in transit, the recipient **MUST** make note of the damage on upon receipt of the product and file a claim with the carrier. AER Control Systems LLC will make a good faith effort for prompt correction or other adjustment, with respect to any product that proves to be defective within the warranty period.

Collection of combustible or explosive materials and collection on flame or spark-generating operations may require specific system configurations (contact AER Control Systems LLC. Applications Engineering Department for questions and/or design assistance). The combined collection of combustible or explosive materials and contaminants from spark or flame generating operations, with a common collector or duct system, is not recommended, unless special design provisions have been made to the system (sparks or flames resulting from such operations may ignite the combustible or explosive material). Under no circumstances should anyone be allowed to discard a lighted cigarette, other burning materials, or refuse into an inlet hood or the duct of the collection system. It is the responsibility of the end user to comply with all applicable national, state, and local fire and safety codes. AER Control Systems LLC's liability for consequential and incidental damage resulting from a fire or explosion is expressly disclaimed.

Installation of suitable overload protection such as a motor starter, according to NEC guidelines, is required. Failure to provide proper overload protection will void warranty coverage on electrical components in the system. (Combination motor starters with fusible disconnect packages are available through your local AER Control Systems LLC. representative). To ensure optimum collector performance always use AER Control Systems replacement filters.